

Application Number 10/507,273  
Amendment dated August 8, 2006  
Response to Office Action mailed June 16, 2006

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**Remarks/Arguments**

**The Claims Rejection Under 35 USC §103 (a)**

Claims 1-2, 4-5, 8-13 stand rejected under 35 USC §103 (a), Examiner asserting that the present invention is unpatentable over Fitzpatrick et al. ("Close-Spaced Thermionic Converters with Active Spacing Control and Heat-Pipe Isothermal Emitters") in view of DiMatteo et al. (US Patent No. 6,232,546) and Nishioka et al. (US Patent No. 4,880,975).

In relation to claims 1 and 2, Examiner asserts that Fitzpatrick teaches a diode device comprising: a first electrode attached to one end of three piezoelectric translators, and a second electrode attached to the opposing end of the three piezoelectric translators and wherein the piezoelectric translators' lengths are attached to controlling circuitry and modified by a signal so that the magnitude of a distance separating the electrodes is adjusted (page 926 Fig 7; page 924). Fitzpatrick is also held to teach wherein three piezoelectric translators are provided in order to maintain parallel electrode surfaces (page 924), though Examiner agrees that FitzPatrick fails to teach wherein the piezoelectric translators are a housing means and a further pair of electrodes is attached to the inner and outer faces of the housing means.

Examiner also asserts that DiMatteo teaches a diode device with the gap between the first and second electrodes to control the distance separating the electrodes and wherein the piezoelectric actuators are a housing means (Fig 6, 34; column 6, lines 14-24; column 6, lines 33-37) in order to maintain the enhanced performance of a sub-micron gap by compensating for thermal effects on the first and second electrodes (column 1 lines 19-23). While DiMatteo teaches that the piezoelectric actuators are attached to control circuitry, it is silent with regards the physical location of the electrodes to control the circuitry.

Examiner also asserts that Nishioka teaches a piezoelectric actuator housing that is adjustable in three dimensions, like the actuator configuration of both FitzPatrick and DiMatteo, wherein a pair of electrodes is attached to the inner and outer faces of the housing (Fig 2, 3 & 31-35; column 2 line 60 to column 3, line 8; column 4, lines 33-35) in order to provide a fine adjustment

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mechanism that is not susceptible to variations in the voltage applied to the actuator (column 1, lines 60-65).

Examiner believes that it would have been obvious to one of ordinary skill in the art to modify the invention of FitzPatrick to have piezoelectric actuators as a housing means, as disclosed by DiMatteo, and have the cylindrical piezoelectric housing with a pair of electrodes for controlling the actuator attached to the inner and outer face of the housing, as disclosed by Nishioka, in order to compensate for thermal effects of the first and second electrodes and maintain the performance of the sub-micron gap and also to provide a fine adjustment actuator that is not susceptible to variations in the voltage applied to the actuator while maintaining the ability to adjust the gap in three dimensions.

First, to establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Applicant draws Examiner's attention to Fig. 1 of DiMatteo, from which it can be seen that vacuum 12 is retained by an unlabeled element, which is clearly therefore a 'housing'. It is to be noted that the term 'housing' is nowhere used in DiMatteo. This same unlabelled element is disclosed in the device shown in Fig. 6, and there is also indication in Fig. 6 that conduction through this 'housing' element is 'glass conduction', which would suggest that the unlabelled 'housing' element is a glass of some kind. In Fig. 6, it is clear that the piezoelectric elements are disposed outside this unlabelled 'housing' element, and that they do not therefore form a housing. Furthermore, it is not clear from Fig. 6 that 34 attached to 14 is the same 34 that is attached to 16; there being other undescribed structures apparently separating them. Thus 14 and 16 are not attached to 'opposing ends' of 34 as they are in the present invention, and therefore 34 cannot be considered to form a housing. Applicant believes therefore that the prior art does not teach or suggest the claim limitation of having a housing means as both housing and distance controller.

Secondly, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the

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knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). Applicant finds no obvious teaching, suggestion or motivation in the references for having a housing means as both housing and distance controller is advantageous. As to the knowledge generally available to a person skilled in the art at the time the present invention was made, it is to be supposed that the "hypothetical 'person having ordinary skill in the art' to which the claimed subject matter pertains would, of necessity have the capability of understanding the scientific and engineering principles applicable to the pertinent art." Ex parte Hiyamizu, 10 USPQ2d 1393, 1394 (Bd. Pat. App. & Inter. 1988. Thus the teaching of both FitzPatrick (published in 1996) and Nishioka (published in November, 1989) can therefore be assumed to have been known to DiMatteo (filing date October 25, 1999), and it would therefore have been obvious to DiMatteo to use the cylindrical housing of Nishioka instead of the three piezoelectric translators of FitzPatrick if there was a reasonable expectation of success. Applicant believes therefore that there is not teaching in the prior art that leads to having a housing means as both housing and distance controller.

To make the scope of the present invention clearer, Applicant has further amended claim 1.

Applicant therefore believes that, the present invention discloses a new principle of operation that has hitherto not been taught in the art whereby a housing means is also a means for adjusting the distance separating the electrodes. This new physical structure disclosed by the present invention affords additional advantages, namely: (page 2, lines 27-9)

*"a tubular actuating element serves as a mechanical connector between electrodes, as an element that regulates the distance between the electrodes, and as vacuum sealing tube."*

The suggested modification to be made to Fitzpatrick's invention to combine the above references has not been taught in prior art, even though the use of piezoelectric elements were prior art to Fitzpatrick, Nishioka and DiMatteo. Prior-art references do not contain any suggestion of combining the references using the modification suggested. It is the Applicant's

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opinion that if the present invention were, in fact, obvious, those skilled in the art would have implemented it by now. Additionally, the inventions of Fitzpatrick, Nishioka and DiMatteo are complete and functional in themselves; therefore there would be no reason to use parts from other references or to make the modifications recommended above.

The fact that those skilled in the art have not implemented and the fact that a modification is required to the combined references, which discloses a new principle of operation, indicates that the present invention is not obvious. Thus, the Applicant requests withdrawal of the rejection of claim 1 and also to claims 2, 4-5, and 8-12, which are dependent upon Claim 1.

In relation to claim 24, Examiner considers that the prior art teaches a second electrode comprising silver. However it is clear that claim 24 relates to electrically conducting material comprising silver paste. Applicant therefore requests withdrawal of the rejection of claim 24.

Applicant notes with gratitude that claims 14-23 and 25-26 contain allowable subject matter if rewritten in independent form including all of the limitations of the base claim and any intervening claim. Applicant has therefore amended claim 13 to include the limitation of claim 14, and cancelled claim 14.

Applicant respectfully submits that this application, as amended, is in condition for allowance, and such disposition is earnestly solicited. No new material has been added by this amendment. If the Examiner believes that discussing the application the Applicant over the telephone might advance prosecution, Applicant would welcome the opportunity to do so.

Respectfully submitted,



Avto TAVKHELIDZE  
Inventor